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HARDWOOD LOG GRADING AND LUMBER VALUE

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INTRODUCTION

For practically every commodity--beef, wool, grains, hides, lard, milk, eggs, etc.--there are standard grades based on quality. A price based on these standards is a fairly accurate measure of value. A person who deals with one of these commodities can use such price quotations in his business operations; in fact, he must. These quality specifications are essential if there is to be any fair and intelligent pricing of the product.

But among the important commodities there is one exception that stands out boldly: logs. Although lumbering is one of the oldest industries, no standard grades have yet been widely used in the buying and selling of logs, the industry's basic raw material. Even in small regions, log prices in terms of real values vary as much as 50 percent. There is little to pin them down except the hunches and guesses of the buyer or the seller.

Some sawmills that deal largely with high-grade logs have set up their own quality specifications, and these work in a limited way. And a small start has been made in the use of generally applicable log grades. This report tells something about hardwood log grades and how they have worked out at one sawmill where they are being used.

LOG GRADING

The quality of lumber that a sawmill produces depends, of course, on the quality of the logs it gets. To make a profit, a sawmill operator must be able to make a fairly close estimate not only of how much lumber he can saw from a log, but also of what quality that lumber is going to be. Will it be mostly clear First-and-Second (FAS) grade lumber that he can sell for a good price? Or knotty No. 3 Common that he may have trouble in selling even at a very low price?

Many an experienced sawmill operator can make a rather close estimate of what a log will yield. He can glance at a log and tell you quickly about how much lumber can be sawed out of it and what quality that lumber will be. However, not all sawmill operators are so gifted. They have to guess at their lumber quality, and gamble on a profit.

There has long been a need for some better way of estimating the potential lumber value of a sawlog--particularly a hardwood sawlog. To fill this need, the U. S. Forest Service's Forest Products Laboratory, at Madison, Wis., a few years ago made a study of the lumber yield from hardwood logs at a number of sawmills. From these studies the laboratory worked out a set of hardwood log-grading rules. These log grades were designed to take some of the gamble out of the sawmill business, to give the sawmill operator a more exact method of estimating the quality--and the real value--of the logs he buys.

These hardwood log grades are based on two major considerations: (1) the size of the log, and (2) the location and the amount of visible defect. Neither factor can be used independently as a basis for grading logs.

Log diameter is important because it is related directly to lumber quality. Most of the knots and rotten places are usually found near the center of the log; for this reason small logs yield a greater proportion of low-grade lumber. The larger the log, the greater the proportion of high-quality lumber. Moreover, there is always a demand--and premium prices--for wide boards and for thick material; and these can be obtained only from logs of fairly large sizes.

Log length is important because of the demand for long boards of high quality; and also for the number of clear pieces of certain minimum lengths that can be cut from such boards. (Log-length requirements for high-grade lumber were derived from the lumber-grading rules of the National Hardwood Lumber Manufacturers Association.) For the lower lumber grades, shorter logs are admitted; and some clear cuttings may be as short as 3 feet.

Defects in a log affect both the quality and the amount of lumber that can be sawed from it. Obviously much wood will be wasted in sawing a crooked log. Rot, splits, holes, and similar defects also cause waste, and reduce the amount of lumber. Some of these defects also lower the quality of the lumber. Knots, another type of defect, lower the strength and appearance of the lumber.

The size, number, and location of the defects in the log are the main factors. The location of defects, knots, and stain is especially important in determining quality. One of these near the end of a log, where it can be trimmed off, is much less serious than

Table 1.--Hardwood log grades used by Otsego Forest Products Cooperative Association

Grade	Length[1/]	Diameter, small end	Maximum crook	Allowable rot, sweep, etc.	Surface requirements 3 visible sides
	Feet	Inches	Inches	Percent	
Select	12-16	16 and up	2	10	Clear: no knots or indications of knots
No. 1	12-16	12, 13	3	25	Clear entire length
	10	14	3	25	Clear entire length
	12-16	14	3	25	80 percent clear in one cutting
No. 2	8-16	10 and up	3	40	Clear entire length
	10-16	10 and up	3	40	2/3 clear in not over two cuttings, each not less than 3 feet long
No. 3	8-18	10 and up	4	40	40 percent clear in cuttings not less than 3 feet long

[1/] Logs must be at least 3 inches longer than stated length to allow for trimming.

one in the middle of a log. When they are grouped in the log, with the groups far enough apart so that clear cuttings can be obtained, they are less important than when they are scattered so that no clear lumber of minimum size can be cut.

The species also must be considered in estimating the value of a log. The market demand for and the available supply of certain woods are factors that determine the value of logs. For example, a hard maple log, even with defects, may be worth considerably more than a clear log of elm or ironwood.

PRACTICAL APPLICATION

One sawmill in the Northeast has been using these hardwood log-grading rules (table 1) longer than any other. It is the Otsego Forest Products Cooperative Association, of Cooperstown, N. Y., a cooperative organized to encourage good forest management as well as to process and market forest products for its members.

The Otsego Cooperative has used these hardwood log-grading rules at its mill since 1939, with satisfactory results. A study made at the mill by the U. S. Forest Service in cooperation with the cooperative illustrates how these log grades have enabled the mill to closely correlate log quality with the value of lumber yield. The study involved 170,000 board feet of hardwood logs, a mixture of hard maple, red oak, beech, basswood, birch, soft maple, elm, ash, cherry, and butternut.

This study showed that nearly one-half of the dollars-and-cents value of the lumber cut from select logs was in the high-priced FAS grade. (FAS is worth more than three times as much as No. 3 Common.) In contrast, only about 5 percent of the value of lumber from No. 3 logs was in FAS lumber. The old saying that "pigs is pigs" is not true with regard to logs; and any buying contract that does not recognize the factor of grade involves very crude business methods on the part of both buyer and seller.

Table 2 shows this relationship of lumber volume and value to log grade.

These results are not startling. They simply show that the log grades work as they were intended to.

In this limited application of log grading, several advantages become apparent. In the first place, the sawmill has a better basis for estimating the lumber value of logs with fair consistency. It can establish fair prices for logs, based on quality as well as volume; and it can be reasonably sure that with the prices it pays for logs, it can get a cash return from the value of the lumber obtained.

Table 2.--Lumber yield from various grades of mixed hardwood logs sawed at Otsego sawmill

(Per 1,000 board feet of logs, mill scale)

LUMBER VOLUME

Log grade	Lumber grade					
	FAS	Select	No. 1 Common	No. 2 Common	No. 3 Common	Total
	Board feet	Board feet	Board feet	Board feet	Board feet	Board feet
Select	358	125	204	177	136	1,000
No. 1	204	86	242	246	222	1,000
No. 2	74	47	228	351	300	1,000
No. 3	23	25	122	374	456	1,000
LUMBER VALUE[1/]						
Select	$46.90	$13.63	$17.95	$10.09	$ 4.62	$93.19
No. 1	26.72	9.37	21.30	14.02	7.55	78.96
No. 2	9.69	5.12	20.06	20.01	10.20	65.08
No. 3	3.01	2.73	10.74	21.32	15.50	53.30

1/ Based on wholesale lumber prices FOB mill as of Jan. 1, 1948. Specific prices per M board feet for 6/4 mixed hardwoods as follows: FAS, $131.00; Select, $109.00; No. 1 Common, $88.00; No. 2 Common, $57.00; No. 3 Common, $34.00.

Fair prices possible through log-grading are also a benefit to the woodland owner and the logger. Farmer A, who markets good clear logs, can expect a better price than Farmer B, whose logs are just as big, but knotty and full of defects. That is fair, and the way it should be.

At the same time, both the woodland owner and the logger have an incentive (and a guide) for producing better logs. If it means a difference in price, they will take care to cut their logs so that any defects will have the least possible effect on the lumber.

Log-grading gives the woodland owner another incentive to

manage his woodland so it will produce saw-timber trees that will make long, clear, select-grade logs. Of course, this is an incentive that puts the goal at long range, but it is a goal that holds a cash reward.

At the same time, log-grading should be directed toward a similar long-range goal. Log-grading does not mean that a sawmill operator should try to get nothing but top-grade logs. It would be rather nice for him if he could; but our forests and woodlands are in no shape for any more skimming off of the cream. In many localities small trees and defective trees should be cut to make room for better growth of the best trees. Log-grading can tell the sawmill operator how much of this low-grade stuff he can afford to handle.